

Remarks

Applicant respectfully request reconsideration of the rejection of the claims in view of the above amendments and the remarks set forth below. Claims 1-29 remain in the application. Claims 1, 2, 10, 11, 13, 22, 24 and 27 are amended. Claims 3-9, 12, 14-21, 23, 25, 26, 28 and 29 remain unchanged.

35 U.S.C. §112

Claims 1-9 and 11-21 stand rejected under 35 U.S.C. §112 due to the phrase “further processing” recited in claims 1 and 11 rendering the claims indefinite. Claims 1, 2, 11 and 13 are amended to meet this rejection. Applicant respectfully proposes that claims 1-9 and 11-21 particularly point out and distinctly claim that which Applicant regards as his invention. Applicant respectfully requests reconsideration of the rejection of claims 1-9 and 11-21 under 35 U.S.C. §112 in view of the amendments and remarks.

35 U.S.C. §102

Claims 11-15, 17-23 and 27 stand rejected under 35 U.S.C. §102(e) as being anticipated by Mendenhall et al. (U.S. Patent No. 6,483,951). For a reference to anticipate a claimed invention, each and every element of the claim must be found in the reference.

Claim 11 is amended to recite “a method of converting interlaced video signals to progressive video signals, said method comprising a) receiving an interlaced video signal representing a luma component specifying luma lines and a chroma component specifying non-interpolated chroma lines...b) *decoding said interlaced video signal and interpolating said non-interpolated chroma lines to produce a processed chroma component specifying both interpolated and said non-interpolated chroma lines* and...c) *deinterlacing said decoded interlaced video signal based on said luma lines and said non-interpolated chroma lines*, whereby said deinterlacing results in a progressive video signal representing a luma component specifying luma lines and a chroma component specifying chroma lines.” Support for this amendment can be found on page 9, lines 1-18 of Applicant’s application. The steps of “decoding said interlaced video signal and interpolating said non-interpolated chroma lines to

produce a processed chroma component specifying **both** interpolated and said non-interpolated chroma lines and...deinterlacing said decoded interlaced video signal based on said non-interpolated chroma lines” is an important aspect of Applicant’s claimed invention because it solves a MPEG decoder deficiency identified by Applicant. More specifically, as described on page 1 of Applicant’s application:

Most MPEG decoders output the chroma component after it has been formatted to match the interlaced luma output. Typically, such MPEG decoders will convert the interlaced 4:2:0 chroma into interlaced 4:2:2 chroma. If the resulting chroma and luma are to be deinterlaced and possibly converted to a different number of lines, the chroma vertical resolution will be degraded if the usual chroma output of the decoder is deinterlaced.

The “decoding said interlaced video signal and interpolating said non-interpolated chroma lines to produce a processed chroma component specifying **both** interpolated and said non-interpolated chroma lines and...deinterlacing said decoded interlaced video signal based on said non-interpolated chroma lines” solution to the MPEG decoder deficiency is further described on page 9 of Applicant’s application:

In accordance with this inventive arrangement, the decoder can output a video signal wherein some of the chroma output lines are not interpolated and all of the original 4:2:0 chroma lines can be present at the output at selected times in the output signal as non-interpolated lines... every-other line of decoder output chroma can be an original 4:2:0 chroma line, wherein the in-between lines can be interpolated lines. Accordingly, the deinterlacer 420 can be configured to ignore the interpolated chroma lines and keep the original chroma lines. In this manner, the maximum chroma vertical resolution on still (non-moving) pictures can be retained in the deinterlaced output.

The office action states that in Mendenhall et al. the display modes of operation described from col. 9, line 50 to col. 11, line 36 disclose a decoder that converts a received 4:2:0 signal into a 4:2:2 signal having a non-interpolated chroma component (R-Y) and an interpolated chroma component (B-Y). Applicant respectfully disagrees. In a conventional 4:2:0 to 4:2:2 conversion the chroma lines of the 4:2:0 video signal are either interpolated, decimated or repeated (i.e., non-interpolated) to generate the chroma lines of the 4:2:2 video signal. The display modes of operation described in Mendenhall et al. merely describe this conventional conversion and do not disclose “decoding said interlaced video signal and

interpolating said non-interpolated chroma lines to produce a processed chroma component specifying **both** interpolated and said non-interpolated chroma lines". More specifically, the Mendenhall et al. display modes 0, 1, 4, 5 and 6 teach repeating (i.e., not interpolating) the chroma lines of a 4:2:0 video signal when converting to a 4:2:2 video signal; the Mendenhall et al. display modes 2, 3, 7, 9 and 10 teach interpolating the chroma lines of a 4:2:0 video signal when converting to a 4:2:2 video signal; and the Mendenhall et al. display modes 8 and 11 teach decimating the chroma lines of a 4:2:0 video signal when converting to a 4:2:2 video signal. Since amended claim 11 contains at least one element that is missing from Mendenhall et al., Applicant respectfully proposes that the rejection for anticipation is overcome.

Dependent claims 12-15 and 17-21, being dependent on and further limiting independent claim 11, should be allowable for that reason, as well as for the additional recitations that they contain. Therefore, it is respectfully proposed that the rejection for anticipation is overcome.

Independent claim 22 is amended to include elements similar to the elements of amended independent claim 11 and should therefore be allowable for the same reasons discussed above as well as for the additional recitations contained therein. Therefore, it is respectfully proposed that the rejection for anticipation is overcome.

Dependent claim 23, being dependent on and further limiting independent claim 22, should be allowable for that reason, as well as for the additional recitations contained therein. Therefore, it is respectfully proposed that the rejection for anticipation is overcome.

Independent claim 27 is amended to include elements similar to the elements of amended independent claim 11 and should therefore be allowable for the same reasons discussed above as well as for the additional recitations contained therein. Therefore, it is respectfully proposed that the rejection for anticipation is overcome.

35 U.S.C. §103

Claims 1-10, 16, 24-26 and 28-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mendenhall et al. Under U.S.C. § 103, the prior art reference (or references when combined) must teach or suggest all of the claim limitations (MPEP § 706.02(j)).

Claim 1, as amended, recites "a method of converting interlaced video signals to progressive video signals, said method comprising...receiving an interlaced video signal representing a luma component specifying luma lines and a chroma component specifying chroma lines, wherein said chroma component specifies approximately one-half the number of lines of said luma component...decoding said interlaced video signal and increasing the number of said chroma lines to approximately the same as the number of said luma lines...decreasing the number of said chroma lines of said interlaced video signal back to approximately one-half of the number of said luma lines *to avoid a vertical resolution degradation of said chroma lines*, whereby said increasing of chroma lines is substantially reversed and...deinterlacing said interlaced video signal, whereby said deinterlacing results in a progressive video signal representing a luma component specifying luma lines and a chroma component specifying chroma lines." Support for this amendment is found in Applicant's application on page 8, lines 18-32. The steps of "decreasing the number of said chroma lines of said interlaced video signal back to approximately one-half of the number of said luma lines *to avoid a vertical resolution degradation of said chroma lines*, whereby said increasing of chroma lines is substantially reversed and...deinterlacing said interlaced video signal, whereby said deinterlacing results in a progressive video signal representing a luma component specifying luma lines and a chroma component specifying chroma lines" is an important aspect of Applicant's claimed invention because it solves a MPEG decoder deficiency identified by Applicant. More specifically, as described on page 1 of Applicant's application:

Most MPEG decoders output the chroma component after it has been formatted to match the interlaced luma output. Typically, such MPEG decoders will convert the interlaced 4:2:0 chroma into interlaced 4:2:2 chroma. If the resulting chroma and luma are to be deinterlaced and possibly converted to a different number of lines, the chroma vertical resolution will be degraded if the usual chroma output of the decoder is deinterlaced.

As noted in the office action, Mendenhall et al. does not teach reconverting a 4:2:2 signal to a 4:2:0 signal. However, the office action also states that it is known to convert a 4:2:2 signal to a 4:2:0 signal to save bandwidth for signal transmission and signal processing. Although it may be known to convert a 4:2:2 signal to a 4:2:0 signal to save bandwidth for

signal transmission and signal processing, prior to Applicant's invention "decreasing the number of said chroma lines of said interlaced video signal back to approximately one-half of the number of said luma lines *to avoid a vertical resolution degradation of said chroma lines*" was not known. As a result, amended claim 1 should be allowable. Therefore, it is respectfully proposed that the rejection of claims 1 under 35 U.S.C. § 103(a) is overcome in accordance with the above amendment and remarks and notice to that effect is earnestly solicited.

Dependent claims 2-9 being dependent on and further limiting independent claim 1, should be allowable for that reason, as well as for the additional recitations that they contain. Therefore, it is respectfully proposed that the rejection of claims 2-9 under 35 U.S.C. § 103(a) is overcome in accordance with the above remarks and notice to that effect is earnestly solicited.

Claim 10, as amended, recites "a method of converting interlaced Moving Picture Experts Group (MPEG) video signals to progressive video signals, said method comprising...receiving an interlaced 4:2:0 formatted video signal *having a chroma vertical resolution*...decoding said interlaced 4:2:0 formatted video signal and converting said video signal to an interlaced 4:2:2 formatted video signal...re-converting said interlaced 4:2:2 formatted video signal to an interlaced 4:2:0 formatted video signal *to retain the chroma vertical resolution of the received interlaced 4:2:0 formatted signal* and...deinterlacing said interlaced 4:2:0 formatted video signal resulting in a 4:2:0 formatted progressive video signal." Support for this amendment is found in Applicant's application on page 5, lines 15-20. The steps of "re-converting said interlaced 4:2:2 formatted video signal to an interlaced 4:2:0 formatted video signal *to retain the chroma vertical resolution of the received interlaced 4:2:0 formatted signal* and...deinterlacing said interlaced 4:2:0 formatted video signal resulting in a 4:2:0 formatted progressive video signal" is an important aspect of Applicant's claimed invention because it solves a MPEG decoder deficiency identified by Applicant. More specifically, as described on page 1 of Applicant's application:

Most MPEG decoders output the chroma component after it has been formatted to match the interlaced luma output. Typically, such MPEG decoders will convert the interlaced 4:2:0 chroma into interlaced 4:2:2 chroma. If the resulting chroma and luma are to be deinterlaced and possibly converted to a different number of lines, the chroma

vertical resolution will be degraded if the usual chroma output of the decoder is deinterlaced.

As noted in the office action, Mendenhall et al. does not teach reconverting a 4:2:2 signal to a 4:2:0 signal. However, the office action also states that it is known to convert a 4:2:2 signal to a 4:2:0 signal to save bandwidth for signal transmission and signal processing. Although it may be known to convert a 4:2:2 signal to a 4:2:0 signal to save bandwidth for signal transmission and signal processing, prior to Applicant's invention "re-converting said interlaced 4:2:2 formatted video signal to an interlaced 4:2:0 formatted video signal *to retain the chroma vertical resolution of the received interlaced 4:2:0 formatted signal*" was not known. As a result, amended claim 10 should be allowable. Therefore, it is respectfully proposed that the rejection of claims 10 under 35 U.S.C. § 103(a) is overcome in accordance with the above amendment and remarks and notice to that effect is earnestly solicited.

Dependent claim 16 being dependent on and further limiting independent claim 11 (discussed above), should be allowable for that reason, as well as for the additional recitations that contained therein. Therefore, it is respectfully proposed that the rejection of claim 16 under 35 U.S.C. § 103(a) is overcome in accordance with the above remarks and notice to that effect is earnestly solicited.

Amended independent claim 24 includes elements similar to the elements of amended independent claim 1 and should therefore be allowable for the same reasons discussed above as well as for the additional recitations contained therein. Therefore, it is respectfully proposed that the rejection of claim 24 under 35 U.S.C. § 103(a) is overcome in accordance with the above remarks and notice to that effect is earnestly solicited.

Dependent claims 25 and 26 being dependent on and further limiting independent claim 24, should be allowable for that reason, as well as for the additional recitations that they contain. Therefore, it is respectfully proposed that the rejection of claims 25 and 26 under 35 U.S.C. § 103(a) is overcome in accordance with the above remarks and notice to that effect is earnestly solicited.

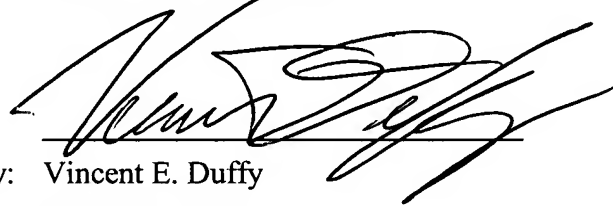
Dependent claims 28 and 29 being dependent on and further limiting independent claim 27 (discussed above), should be allowable for that reason, as well as for the additional

recitations that contained therein. Therefore, it is respectfully proposed that the rejection of claim 16 under 35 U.S.C. § 103(a) is overcome in accordance with the above remarks and notice to that effect is earnestly solicited.

Having fully addressed the Examiner's rejections it is believed that, in view of the preceding remarks, this application stands in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicants' attorney at (317) 587-4019, so that a mutually convenient date and time for a telephonic interview may be scheduled.

No fees, other than those discussed above, are believed due. However, if a fee is due, please charge the additional fee to Deposit Account 07-0832.

Respectfully submitted,



By: Vincent E. Duffy

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Patent Operations

THOMSON multimedia Licensing, Inc.

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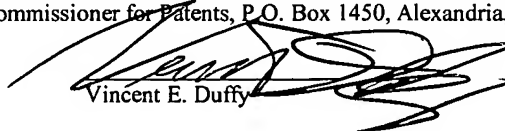
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November 19, 2004

CERTIFICATE OF MAILING

I hereby certify that this amendment is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on:

11/19/04
date



Vincent E. Duffy

Report to Data Base
Docket No. PU000183
Inventor(s): Donald Henry Willis
Title: Method and System for MPEG Chroma De-Interlacing

PATENT OPERATIONS
Serial No. 101003,565
Filed: 10/24/2001

Patent No. _____
Atty: Vincent E. Duffy

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APPLICATION AS FILED									
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	After Allowance U/R312		Reply Brief						
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